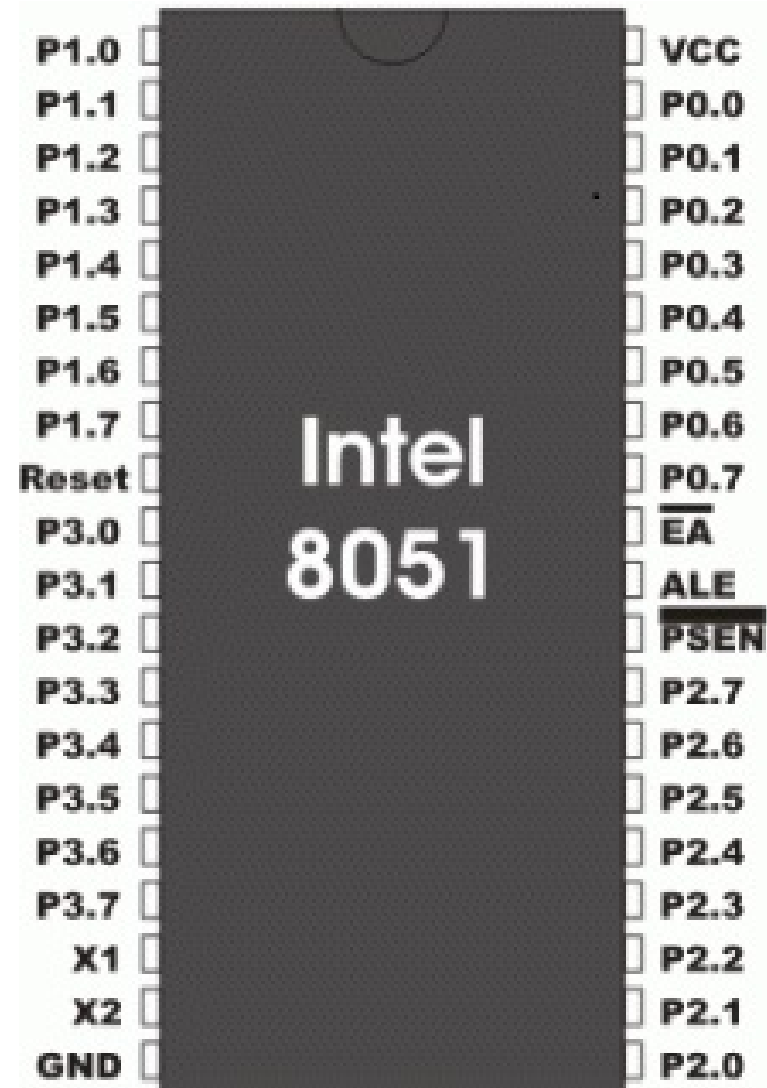


8051 ARCHITECTURE

- The 8051 is an 8-bit processor
- 128 bytes of RAM
- 4K bytes of on-chip ROM
- Two timers each of 16 bits
- One serial port
- Four I/O ports, each 8 bits wide
- 8 bits program status word (PSW)
- Oscillator and clock circuits
- 4 register banks where each has 8 registers
- 21 SFRs (Special Function Register)

PIN DIAGRAM OF 8051



INPUT / OUTPUT PORTS

- The four 8-bit I/O ports P0, P1, P2 and P3 each uses 8 pins.
- PORT 0: It can be used for input or output, each pin must be connected externally to a 10K ohm pull-up resistor.
- PORT 1,2 & 3: these ports do not need any pull-up resistors since they already have pull-up resistors internally.
- To reconfigure it as an input, a 1 must be sent to the port.
- To reconfigure it as an output, a 0 must be sent to the port.
- All the ports upon RESET are configured as input, ready to be used as input ports.
- Sometimes we need to access only 1 or 2 bits of the port, then we use 'sbit' to use these pins separately.

PSW (Program Status Word)

CY	AC	F0	RS1	RS0	OV	--	P
----	----	----	-----	-----	----	----	---

CY	PSW.7	Carry flag.
AC	PSW.6	Auxiliary carry flag.
F0	PSW.5	Available to the user for general purpose.
RS1	PSW.4	Register Bank selector bit 1.
RS0	PSW.3	Register Bank selector bit 0.
OV	PSW.2	Overflow flag.
--	PSW.1	User-definable bit.
P	PSW.0	Parity flag. Set/cleared by hardware each instruction cycle to indicate an odd/even number of 1 bits in the accumulator.

RS1	RS0	Register Bank	Address
0	0	0	00H - 07H
0	1	1	08H - 0FH
1	0	2	10H - 17H
1	1	3	18H - 1FH

INTERFACING WITH 8051

- Interfacing of LEDs with 8051 microcontroller.
- Interfacing of LCD with 8051 microcontroller.
- Interfacing of DC motor with 8051 microcontroller.
- Interfacing of 7-segment with 8051 microcontroller.

PROJECT

WORK

INTRODUCTION TO METRO TRAIN PROTOTYPE USING 8051

- This project is designed to demonstrate the technology used in now a day's driver less metro trains.
- These trains are equipped with the CPU, which controls the train.
- The train is programmed for the specific path.
- Every station on the path is defined; stoppage, timing of the train and distance between the two stations is predefined.

To be continued...

...

- Here we are using 2 stepper motors. One represents the motion of the train and the other represents the opening and closing of the doors.
- We are using an LCD display to provide information.
- Before stopping at station, the LCD will display the up next station's name, then the indication of opening/closing of the doors.

Proposed Circuit for Metro Train Prototype

